

The Casual relationship model between Commercial Banks' Performance and Risk Management in Yemen: Panel Evidence

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Abstract:

Slow growth in the banking sector has been the case in the Middle East and North Africa (MENA) region in the 1970s and 1990s. This situation was the case for Yemen, the banking sector is dominated by public sector banks, which are characterized by government intervention in credit allocations, losses and liquidity problems and wide interest rates spread, poor asset quality, non-performing loans, cash and overall liquidity constraints. Given that poor banking sector performance may have negative consequences on the financial sector and hence economic growth. We investigate empirically the determinants of bank performance and its implication on bank risk management in Yemen from 1998-2013 using panel data evidence. The study shows that non-performing loans negatively affect profitability. Weak risk management mechanisms, non-optimal interest rates spread were also observed as factors that affect the liquidity and general operations of banks in Yemen and hence profitability. In general all the six banks are profitable with a very minimal average Return on Assets (ROA) of 0.69% and average 29.2% volume of non-performing loans. The hypotheses that, prudent risk management improves banks performance and that casualty exists between

bank performance and risk management are supported as it is evidenced by the Pair wise-Correlation matrices and Granger Casualty test. This study contributes to current literature by providing an econometric understanding of relationship in bank performance and bank risk management for the MENA countries. This understanding is important for academics, policy makers and development organizations in shaping the future banking and financial sector infrastructure and hence economic growth.

Keywords: Bank Performance, Bank Risk Management, Panel Evidence, Correlation, Causality Test and Yemen.

Introduction

Albeit the Central Bank in its implementation of monetary policy has a sole responsibility of monitoring and supervising the activities of Commercial Banks in Yemen through both on-site and off-site bank examination executed by the Supervision Department adhering to the statutory and prudential requirements such as the Capital Adequacy, Management Efficiency, Liquidity and Sensitivity to risk (CAMELS) ratings of the Basel 1,2 & 3 according to Part III of the Banking Act

2000, revised 2010, in order to eradicate and mitigate banking system risk to a lower ebb. The banking sector performance and its implication on risk management practices is a controversial topic fraught with difficulties and challenges that ultimately results to poor banking performance that incubate tendency and leading to unfavourable banking performance with unclear balance sheet, bank failure and crisis in the financial sector leading to a systemic risk and thus have a negative functional ramification on economic growth. This study does not ignore banking system failure and its consequences it may have on the financial sector and the overall growth climate.

Recently, the world has witnessed one of the most devastating financial meltdowns of 2007-2009, as a result of ineffective and inefficient policy and procedures of statutory prudential requirement. The most affected sector was the financial services industry, particularly the banking sector and it became a regular target for tougher regulation, public anger and academic critics, and one factor that has received considerable attention during the financial crisis is risk management discourse. However, studies on banks performance and its implications on risk management in the banking industry are rare; examples of some of the studies in addition to the financial turmoil of 2007-2009, was the economic crisis of Vietnam and the banking and financial crises in Asia largely on account of Non-performing loans (NPL) with inappropriate loan loss provisioning and forced several banks in Indonesia and Thailand to collapse and close operation. (Ahmed and Ariff, 2007)

The performance of the banking sector can be affected by internal and external factors characterized by bank specific factors (Management, Board and Ownership etc)

and macroeconomic factors (Inflation, Real Interest Rate, Real Gross Domestic Product etc). Banks play a pivotal role as depositories and often provide the main financial instrument for household wealth and are the major financial intermediaries in developing countries. (Gelb, 1989). This implies that maintaining confidence in the banking sector is important for avoiding a disruption of the financial sector and hence economic growth.

Much of the existing literature on banks profitability and its implication on risk management attribute greater importance to the rate of physical capital accumulation in the process of economic growth; the rate of capital accumulation in the banking sector depends upon the control of its quality, quantity and efficiency of its risk management. The advent of the financial services modernization Act of 1998 was embraced with a lot of excitement by banks to diversify into broader range of services and products making life really cool for banking entrepreneurs and managers. During periods of increased uncertainty banking institutions may decide to diversify their portfolio and/or raise their liquid holdings in order to reduce risk. However, this diversification advantage is once in a life time opportunity that should be consumed with some caution and prudence as this may involve a great deal of risk, therefore the very nature of banking business is so sensitive because credit creation process exposes banks to high default risk and thereby affecting its liquidity and general operation that might lead to financial distress including bankruptcy (Saunders and Cornett, 2005).

To this end, the need for risk management in the banking sector is inherent in the nature of banking business. Poor asset quality and low levels & deficient liquidity position are

the two major causes of bank failures. However, in today's dynamic environment, banks are exposed to a large number of risk such as credit risk, liquidity risk, operational risk and macro economic instability, (inflation, weak growth) among others are the risks that creates some source of threat for banks survival and success (Al-Tamimi, Al-Mazrooei, 2007).

It is important to note that the instability of the banking sector offer important theoretical insights and policy recommendation that are particularly valuable in areas of the world suffering from banking and financial crisis and low level of domestic mobilization of capital for investment and economic growth. Consistent with this notion, on building a safe, sound and stable banking system and promote financial and economic growth in the Middle East and North Africa (MENA) region requires robust approach to building the confidence and stability of the Banking sector and hence economic growth. Slow growth has been the case in the region since the 1970s and 1980s. This worsened in the 1990s partly as a result of civil unrest and political instability in the region which adversely affected planning and growth. (Central Bank of Yemen Annual Report, 2013)

The financial sector performance of most MENA countries in the 1990s spanning to early 2000s has been dismally limited, with uneven reforms in the financial sector, the banking sector is dominated by public sector banks, which are characterized by government intervention in credit allocations, losses and liquidity problems and wide interest rates spread. Given the growing concern by MENA countries to improve on the poor growth episodes and financial sector restraints of the 1970s to 1990s, development of the financial sector attracted considerable attention from policy

makers across the region with prudent reforms in the sector by improving access to finance for investment and extensive liberalization of the financial sector in the region, managing banking risk to its low ebb (International Financial Institutions and Yemen Country Report, 2007).

This scenario was the case for Yemen, the growth performance of the country in the last decades was weak, and classified as the poorest country in the MENA region, coupled with the range of successive crises and growth challenges led to increase in poverty and food insecurity. The financial sector in Yemen is dominated by the banking sector, as is the case for most developing countries and is considered as one of the weakest in the MENA region and as such any failure in the sector has an immense implication on the economic growth of the country. This is due to the fact that any unfavourable banking performance say bankruptcy that could happen in the sector has a contagion effect that incubate tendency of banking systemic risk that can lead to lack of confidence in the banking Industry, bank runs, crises and economic turmoil. (Financial Infrastructure Development Project of Yemen, 2013)

The poor and unfavourable performance of the economy is partly blamed to the ineffective and inefficient functioning of the banking system as demonstrated by the untimely and inadequate bank supervision, weak coordination among banks and the subjective assessments of credit creation not consistent across banks and leading to high volume of non-performing loans and liquidity problem and impacts negatively on the banking industry. The sector was significantly affected by the uncertainties of the 2011 crisis leading to a fall in banking balance sheet as large deposit withdrawals in both local and foreign currencies were made

(Almekhlafi et al., 2015)

To address these problems, Central Bank of Yemen (CBY) and the Banking Acts were revised in 2012, to provide sound legal framework, increasing the scope of financial liberalization and intermediation consistent with a more Independent Central Bank and effective banking supervision. These measures resulted to good overall financial performance in the country. There are currently a total of 17 Commercial Banks¹ in Yemen and consists of 12 (twelve) conventional banks and 5 (five) Islamic banks. In terms of ownership status, the conventional banks include 3 (three) state-controlled banks, 4 (four) domestic private banks, and 5 (five) foreign owned banks while, Islamic banks include one state controlled bank and 4 privately owned banks. Competition is generally weak due to dominance of a few, mainly public sector banks. Despite the progress made thus far, the sector is still faced with systematic and institutional inefficiencies. (Central Bank of Yemen Annual Report, 2013)

Given the abysmal and unfavourable performance of the banking sector in Yemen since 1990s to mid 2000s, such as poor asset quality, non-performing loans, cash and overall liquidity constraints even with the introduction of the IMF and the World Bank Structural Adjustment Programmes (SAP) coupled with banking failures in developed countries and the bailouts in 2007-2009, we ask the question; what are the determinants

of banks performance and its implication on risk management in Yemen? Specifically, we seek to address the following questions (i) Is there correlation between banks performance and risk management in Yemen? (ii) Can the stability of the banking sector increased investments in the financial sector and hence economic growth? The economy of Yemen provides a good laboratory test as it has fraught with weak Banking sector performance for a very long time. Therefore, the purpose of this paper is to examine empirically the determinants of banks performance and its implication on Bank risk management in Yemen from 1998-2013 using panel data evidence which provides the advantage of combining both time series and cross section dimension of the data. (Green, 1993)

Due to data limitation, of the 17 Commercial Banks in Yemen, a sample of 6 (six) banks is selected. These include the National Bank of Yemen (NBY), Arab Bank (AB), Yemen Commercial Bank (YCB), Bank Credit to Housing (BCH), Calyon Bank (CB) and Cooperative and Agricultural Credit Bank (CACB) over the period 1998-2013. These are the largest banks and accounted for over 50% the banking system assets and have been rated by the Bank Scope, an internationally recognized data base covering over 28,900 banks worldwide as the top most six commercial banks in Yemen with large resource base and customer base. (International Monetary Fund, Country Report, 2013). Data on the determinants of Banks performance were collected from Bank scope data base (2013), and the World Development Indicators data base (2013)

This study contributes to the current literature in the following ways. This study is the first study in the context of Yemen to investigate the determinants of bank's performance and its implication on risk

¹ Cooperative and Agricultural Credit Bank, National Bank of Yemen, Yemen Bank for Reconstruction and Development, Housing Bank, Islamic Bank of Yemen, Saba Bank of Yemen, Tadhamon International Islamic Bank, International Bank of Yemen, Yemen Kuwait Bank, Yemen Commercial Bank, Arab Bank, United Bank, Calydon Bank, Rafidian Bank, Industrial Bank of Yemen and Bank Credit to Housing. Finance for All, World Bank (2009).

management (credit risk, liquidity risk, interest rate, operational and market risk). Second, the study attempts to capture empirically the impact of Bank Market Share (BMS) and Capital Adequacy Ratio (CAR) within the sampled banks on profitability and implication on risk management. Third, the study captures bank efficiency, which is a measure for operational risk in the industry, and finally, it contributes to the literature by providing an econometric relationship of Banks' performance and implication on risk management in Yemen, this understanding is important for academics and regulators especially the monetary policy makers in shaping the future stability of the banking sector in the MENA region in particular and globally. Primary weakness of the study is limited availability of the data. Analysis is therefore, restricted to a smaller number of variables than desired because of these limitations. However, adequate data is still available for the purpose of this research.

The rest of this paper is organized as follows: section 2, the literature review, section 3, the methodology and data, section 4, is the empirical results and discussions and finally, section 5 the conclusion

2. Literature Review

This section reviews theory and empirical literature in the context of developing and developed countries and to review a broader literature strand on the connection between Banks performance and risk management practices. A number of studies on the connection between Banks performance and risk management utilizes the traditional profit theory, measured by the Return on Assets (ROA) and the Return on Equity (ROE) have been conducted mostly in developed countries, but studies are limited on how banks performance and its implication on risk management impact on

the stability of the banking industry for MENA countries.

The connection between banks performance and risk management is very crucial and very important in the understanding of carrying out an empirical analysis on the determinants of banks performance and its implication on risk management practices. Available theories and empirical evidences are presented on the connection between bank profitability and credit risk management, banks performance and liquidity risk and banks performance and the macroeconomic conditions.

2.1 Theoretical Literature

The fact that Banks accepts deposits and transforms them into loans makes them vulnerable to the risk of default. In short, banks are in the risk management operations and should therefore assess and manage risks, leading to prudent banks performance and profitability for a safe and sound financial system in the economy. Usually, banks are faced with both internal and external determinants that closely linked to credit risk, liquidity risk, interest rate risk and the macroeconomic climate (inflation risk, weak gross domestic product etc) that affect their profitability, solvency and sustainability.

A sound and profitable banking sector is necessary to withstand adverse conditions and hence contribute to the stability of the financial sector. Therefore banks profitability is normally expressed as a function of internal and external determinants, particularly so, when the banking sector in recent years is undergoing major transformation in its operating environment (Athanasoglu et al., 2005)

The success of banks performance to a greater extent depends on effective and efficient management of credit risk. Credit

risk is the risk of a financial loss to the banking industry if customers or counterparty to a financial instrument fails to meet its contractual obligations and arises principally from the industry's loans and advances to customers (Heffernan, 1996). Increase in credit risk may raise the marginal cost of debt and equity, which will increase the cost of fund for the bank and therefore result to liquidity and solvency constraints. Credit risk is crucial to banks performance since the default of customers can lead to fall in banks assets and undermine solvency. (Bessis, 2002)

According to Nissanke and Aryeetey (1998) credit risk can best be mitigated by banks with repetitive interactions by both banks and borrowers, collateral securities, or be a customer and hold a deposit account with banks for a certain period before credit request are considered. They noted however that, credit request should be based on viability and return on projects, information references with other banks about credit worthiness of borrowers and information from third parties usually superior officers in the same place of work with proper monitoring to mitigate risk of default.

Banks profitability also depends on prudent liquidity risk management; this risk is faced on the condition that the industry will encounter difficulty in meeting obligations from its financial liabilities that are settled by delivery cash or other financial assets. According to the Basel Committee on Banking Supervision (1997), liquidity risk results from the incapacity of a bank to absorb decreases in liabilities especially in meeting the demand of customers' withdrawal of funds in meeting its short term liabilities. This implies that when banks are faced with inadequate liquidity its constraints with adequate funds either by increasing liabilities or by direct conversion

of assets more timely on cost effective basis, and thereby impact negatively on profitability. This is why it is a policy for all commercial banks to submit very often liquidity report to the Supervision Department of the Central Bank for an effective and efficient monitoring and supervision of banks liquidity status adhering to the minimum cash ratio, demand deposit and Quasi money for the overall liquidity ratio to mitigate and eradicate the risk of meeting their short term liabilities.

Therefore, it is necessary for banks to ensure that they have sufficient liquidity to meet their liabilities when due under both normal and stressed conditions. To this end, banks should put possible alternative scenarios such as developing a maturity ladder (gap analysis) taking into consideration the expected behaviour of assets, liabilities and off-balance sheet items and identifying the relationships necessary for the industry to establish funding sources, diversify to meet liquidity needs under possible adverse conditions.

Prior to the financial crisis of 2007-2009, little attention was focused on liquidity risk management. As (LandsKoner and Parough, 2008) pointed out that there has been extensive academic and policy interest of the different banks risks including credit risk, market risk and even operational risk, but liquidity risk is rare to be mentioned. However, in recent years, liquidity risk has become one of the major risks faced by banks and has attracted more attention by researchers, academicians and policy makers, particularly during the financial meltdown of 2007-9 and has prompted banks as a wake-up call of the relevant of liquidity risk management. Therefore, sound and safe banking performance requires strengthening of its liquidity risk management strategies and techniques.

Operational risk is the risk of direct or indirect loss arising from a wide variety of causes associated with the industry processes, personnel, technology and infrastructure from external factors other than credit. Hence it arises primarily from all of the industry's operations. The primary objective is to manage operational risk so as to balance the avoidance of financial losses and damage to the banking sector reputation with overall cost effectiveness and control procedure that restrict initiative and creativity. Therefore, operational risks are mitigated thorough appropriate segregation of duties, training and professional development, and carrying periodic assessment of operational risks faced, control and procedure to address the risk identified, compliance with regulation and other prudential and legal requirements. Nissanke and Aryeetey, 1998)

The macroeconomic climate such as inflation rate, interest rates, growth rate of an economy and the growth of money supply does affect banks performance. In period of slow growth, the demand for credit decreases which ultimately impact negatively on banks performance. However, during boom period-strong growth of an economy may lead to high demand for credit to further stimulate investment (Atthanasglou, 2005). Revell (1979) observes that the effect of inflation on banks performance depends on whether the wages and other operational expenses increase above the inflation rates. If inflation can be precisely predicted, banks can reasonably control the operational cost they faced.

Consistent with this notion, Perry (1992) opines that the condition under which inflation affect the profitability of banks largely depends on inflation expectation, concluding that if a bank correctly

anticipates the inflation rates, its can adjust the interest rates to generate more revenues above their costs to realize profit. To this end, the relationship between inflation and banks profitability is subject to correct anticipation of inflation expectation. Hence, banks performance and inflation direction is mixed and remains opens to be debated. These relationships provide the theoretical underpinnings for the current study.

2.2 Empirical Literature

In terms of the empirical evidence, a number of studies employed financial ratios such as loan loss reserves to gross loans, return on assets, return on equity and non-performing loans, liquidity as a ratio of total deposit etc, to determine the performance of banks and implication on risk management practices. For example, Brewer (1989) to investigate the impact of banks performance on credit risk, using the ratio of bank loans to assets. The result reveals a positive relationship between banks loans and credit risk. However, in a similar study by Altunbas (2005), he finds that improvement in credit risk management strategies might suggest that banks loans to assets negatively related to bank credit risk and concludes that banks loans are relatively illiquid and result to higher default risk than other bank assets.

In a study to investigate the relationship between banks performance and credit risk management, using return on asset and return on equity as measures of banks profitability and the ratio of non-performing loans to total loans as indicators of credit risk, Felix and Claudine (2008) finds that the return on equity and return on assets are negatively related to the ratio of non-performing loans to total loans of banks. The study by (Ahmed and Ariff, 2007), to examine the key determinants of banks performance and credit risk in developing countries and developed countries, the result

indicates that risk of default in the emerging developing economies were higher than that of developed economies, concluding that regulation and statutory prudential requirement are significant to the banking system that provides varieties of products and services. Therefore, prudent credit risk management is critical in the case of loan dominated banks in emerging market developing economies.

To assess banks' performance and implication on liquidity risk, Amran, (2009) using liquidity risk as endogenous determinants of banks performance within the framework of panel data set of 12 Commercial in Malaysia over the period 1994-2006 adopting the fixed effects regression. The result reveals that liquidity risk negatively impact on banks profitability, i.e the return on assets and return on equity ROA and ROE and concludes that banks with wider financing gap may be constrained to obtain stable and cheap funds and thereby resort to liquid assets or solicit external funds to match the demand of funds. This will increase banks cost of funds and lower profitability. However, they observe that liquidity risk increases banks' net interest margin (NIM), indicating that banks with high volume of illiquid assets in loans may attract higher interest income.

Many studies have focused on liquid ratios to assess banks performance and liquid risk, for example to examine the effect of banks' profitability on liquidity risk. Bourke (1989) uses liquidity assets to total assets for 22 commercial banks in developed countries, and obtains a higher liquidity ratio. Similarly, Shen et al., (2001) using liquidity assets to deposit ratio on one hand and liquidity assets to customer and short term financing on the other hand. Shen et al., (2001) also obtains a higher value of liquidity ratio, concluding that the higher

value of the liquidity ratio indicates better performance of banks liquidity position. The higher the value of the liquidity ratio, using these measures, the more liquid a bank is and hence the less it faces liquidity failure.

However, when applying loans to assets ratio measures, (Demirguc-Kunt and Huizingu, 1999) finds a higher value of liquidity ratio, in a similar study by (Pasiourus and Kosmidou, 2007) using net loans to customers and short term financing, the result indicates also a higher value of liquidity ratio, and suggesting that with these measures, higher value of liquidity ratio means the more likely the liquidity risk and the more banks faces liquidity problem. Molyneux and Thornton, 1992), (Barth et al., 2003) find a positive effect between banks' profitability and liquidity risk. While Kosmidou (2008) finds a negative effect between banks profitability and liquidity risk.

To test whether economic conditions affects banks profitability, (Mayer and Yeager, 2001) employs a set of macroeconomic factors such as inflation and GDP growth, by fitting an OLS model when the return on assets is the dependent variable, the loan loss provision, inflation, GDP growth and non-performing loans as independent variables. (Mayer and Yeager ,2001) find that GDP growth is significant at the 1 % level and impact positively on banks' profitability. However, the relationship between inflation and banks performance is mixed. Moreover, in a study another study by Moosa (2008) to determine banks performance and macroeconomic climate (inflation and GDP) in Europe using linear multiple regression models and the Generalized Least Square (GLS) on panel data. Inflation is found to impact negatively on banks profitability and statistically insignificant, while GDP is inconclusive.

On balance, literature survey reveals that numerous studies have looked at the determinants of banks' profitability and its implication on risk management; results of these studies are mostly inconclusive. These contradictory conclusions emerging from the empirical literature are one of the motivations for the present investigation. To the best of our knowledge, in the context of Yemen this is the first study that looks at how banks performance and its implication on risk management impacts on the banking industry. Findings of the study contribute to theory by explaining the relationship between banks' performance and risk management. This is of important for policy makers who seek to develop policies for sustained banking sector. This understanding is also of significance for investors and businesses who seek to invest in profitable ventures for superior risk-adjusted returns in the banking sector.

3. Materials and Methods

The study adopts a quantitative approach in the analysis. It makes use of Secondary data collected from Bank Scope and the World Development Indicators data base (2013) for sixteen years (1998-2013) period. Due to data limitation a cluster sample of 6 (six) banks is selected. As stated earlier, these banks have been rated as the six largest banks in Yemen, and accounted for over 50% of banking system assets with large customer base.

Taking a clue from previous studies by (Felix and Claudia, 2008) and (Chung et al., 2009), however, this study improves on the model by including the capital adequacy ratio, the market size of the bank and efficiency ratio to capture empirically their impacts on banks profitability and implication on risk management in Yemen. These therefore motivate the study and we

propose the following hypotheses that can be tested.

H₁: Banks performance correlates positively with sound and efficient Bank risk management

H₂: Causality exists between banks performance and Bank risk management practices

The correlation matrices is applied to determine the first hypothesis and to also detect the existence of multi-collinearity among the explanatory variables, the Granger causality test is used to determine the second hypothesis. An examination of these issues will help provide guidelines for sound banking performance and prudent risk management strategies in order to enhance the quality of banks risk assets and can also be used to design policy that can attract a safe and better financial system for sustainable economic growth.

The regression model is therefore specified with the return on assets (ROA) as dependent variable which is an indicator of banks profitability and intended to measure deposit takers efficiency in using their assets. The explanatory /independent variables are as follows:

- NPL/TL: the ratio of non-performing loans to total loans denoted as NPL* and is a measure of credit risk.
- IRS/TA: Interest rates spread, which is the difference between the interest rates on loans and the interest rates on deposit, divides by the total assets and denoted as IRS*. (If the gap is large, it may lead to adverse selection and moral hazard problem posing a high rate of default and thus affect profitability)
- Capital Adequacy Ratio: (CAR), is measured as the total capital to total risk weighted assets, it is also a surrogate for

regulation by the central bank that is intended to judge the internal strength of a bank to withstand losses during crisis situation and has direct impact on banks profitability.

$CAR = (\text{Tier 1 Capital} + \text{Tier 2 Capital}) / \text{Risk-weighted assets}$.

- (LIQ/TD), measured the ratio of the liquidity to total deposit, it is used to represent the bank's ability to efficiently and economically decrease deposit and to fund increase in loan demand without negatively affecting its earning. It also intended to capture the liquidity mismatch of assets and liabilities and provide an indication of the extent to which deposit takers can meet the short-term withdrawal of funds without facing liquidity problem and denoted as LIQ*

- Bank Market Size (BMS): this reflects the size of the bank in the industry; it is obtained by dividing the assets base of each bank to the total asset base of the banking Industry. For our case, we consider the 6 (six) sampled banks as representative of the banking industry of the country. Hence $BMS = \text{Each Bank assets} / \text{Total assets of all the six sampled banks}$ denoted as BMS*

- Efficiency Ratio, this reflects the ratio of overheads to total assets, hence $\text{Efficiency Ratio} = \text{Overheads} / \text{Total Assets}$ and is a measures operational risk, denoted as ER

Source: Bank Scope Database, (2013)

- Inflation (INF) measured as the consumer price index on an annual basis with 2000/1998 as base year and Gross Domestic Product Growth (GDPG) measures on an annual basis are macroeconomic indicators that are outside the control of banks and can affect their performance.

Source: World Development Indicators data base (2013)

Generally, the model is specified thus,

$$Y_{it} = \alpha_0 + \alpha_{it}X_{it} + \mu_{it} \quad (1)$$

where $i=6$ cross sections and $t=1998-2013$, Y_{it} the dependent variable which reflects the bank performance measured by the Return on Asset (ROA), and X_{it} is a vector of the independent variables that reflects credit risk, liquidity risk, market risk and operational risk. These variables have been selected because of their relevance to the model. The intercept (α_0), varies across banks to empirically account for the specific effect for each bank, and the slope coefficient (α_{it}) measures the impact of the explanatory variables on banks profitability.

Based on the above, the model can be decomposed thus,

$$ROA = \alpha_0 + \alpha_1 NPL^* + \alpha_2 IRS^* + \alpha_3 CAR + \alpha_4 LIQ^* + \alpha_5 BMS^* + \alpha_6 ER + \alpha_7 INF + \alpha_8 GDPG + \mu_t \quad (2)$$

From equation (2), $\alpha_1 < 0$, $\alpha_2, \alpha_3, \alpha_7, \alpha_8 > 0$ or < 0 , $\alpha_4, \alpha_5, \alpha_6 > 0$, and μ_t is the error term.

The restrictions in the above model are based on economic theory and their expected signs (coefficients to be estimated) can be tested in the analysis, it implies that a unit increase in the independent variable will lead to a unit decrease (< 0) or increase (> 0) in the Return on Assets (ROA)

3.1 Estimation Procedure

Panel data regression estimates with the fixed effect is applied to determine the impact of the explanatory variables on Bank performance and its implication on bank risk management practices in Yemen. This technique suffers less from distribution issues and also adjusts for the problem of heterogeneity of the six banks selected for

this research. Hence more informative and efficient (Gujarati and Sangeetha, 2007)

3.1.1 Descriptive Statistics

Descriptive statistics is carried to determine the nature of the mean, median, standard deviation, skewness, kurtosis and the Jarque-Bera (JB) test of normality of the distribution of the data set. An econometric view (EView-6) is applied in the analysis.

3.1.2 Correlation Matrices

The pair-wise correlation matrices is applied to test the first hypothesis that correlation exists between banks performance and its implication on risk management and to also determine the existence of multi-colinearity among the variables.

3.1.3 Granger Causality Tests:

$$X_t = \gamma_0 + \sum_{i=1}^n \delta_i X_{t-i} + \sum_{j=1}^m \sigma_j Y_{t-j} + \mu_{1t} \quad (3)$$

$$Y_t = \alpha_0 + \sum_{i=1}^n \alpha_i X_{t-i} + \sum_{j=1}^m \beta_j Y_{t-j} + \mu_{2t} \quad (4)$$

Where m and n are the number of lagged, X and Y are the terms respectively. μ_{1t} , μ_{2t} are the random errors $\square \left(\begin{matrix} \mu_{1t} \\ \mu_{2t} \end{matrix} \right)$ Equation (3) predicts that X_t is related to past values of itself as well as that of Y_t and equation (4)

This test is applied to test the second hypothesis that causality exist between banks performance and its implication on risk management in Yemen. Causality is an important concept in empirical analysis and refers to the ability of one variable to predict or cause the other. The Granger (1969) causality procedure is developed to test for causal relation. According to Granger, Y causes X if the past values of Y can be used to predict X more precisely then simply using the past values of X and vice versa. Therefore, the relevance of this test is to determine the direction of causation between two variables(X and Y) in a time series data. The idea behind this test is to run the following bi-variate regression models, if we want to determine the direction of causality between X and Y

predicts similar trend for Y_t . If we want to test whether X causes Y or/and Y causes X we carry out an F-test on the joint significance of σ_j and α_i respectively. Therefore, we proceed with the test thus:

$$H_0 : \sum_{j=1}^m \sigma_j = 0 \text{ and } H_0 : \sum_{i=1}^n \alpha_i = 0, \text{ respectively}$$

We reject H_0 , if the calculated $F^* > F_{n-k}^m$ (k is the number of parameters estimated in equations (3) and (4), n is the number of observations. Otherwise we do not reject H_0

. We may also use the Probability value of the F-statistic to make a decision based on the significance level, usually 1%, 5% and 10% respectively.

4. Empirical Result and Discussions

Table 1: Summary Statistics

Variable	Mean	Median	Max	Min	Std. Dev	Skewness	Kurtosis	Jarque-Bere Test	Prob
ROA	0.69	0.61	12.6	1.16	2.24	1.12	3.32	20.3	0.00
NPL*	29.2	28.9	13.2	3.7	2.92	1.50	4.91	49.9	0.00
IRS*	5.34	5.01	7.33	4.5	0.71	1.62	4.67	52.4	0.00
CAR	24.8	22.15	8.97	-31.7	9.2	0.51	4.17	9.5	0.00
LIQ*	53.2	50.2	10.4	1.9	2.12	2.74	10.16	48.1	0.00
BMS*	0.07	0.05	9.03	0.03	0.03	1.18	3.39	22.7	0.00
ER	20.8	19.6	2.06	0.04	0.09	4.58	3.21	65.1	0.00
INF	10.0	10.8	18.9	4.59	4.01	0.53	2.6	5.01	0.08
GDPG	2.89	3.93	6.18	-15.8	4.82	-3.30	12.6	53.4	0.00

Max= Maximum, Min=Minimum and Std. Dev=Standard Deviation, values in the table are in percentages.

The descriptive statistics in table 1 above reveals that all the six banks are profitable with an average return on asset of 0.69%, and with a standard deviation of 2.24. On average 29.2% of the loans are not performing, this is fairly large and hence reduces profitability. However, the Capital Adequacy Ratio shows that the banks are adequately capitalized with an average value of 24.8% far above the minimum capital requirement of 12% and 15% for National and International banks respectively in Yemen. The liquidity position of the banks, on average is 53.2%, which is not fairly sound and the efficiency ratio which reflects operational risk is fairly poor with an average value of 20.8%. The banks market share shows an average of 0.07% and the interest rate spread mean value is 5.34%, implying that the difference between the lending rate and deposit rates is not fairly competitive and hence reduces profitability. With 1% to 2% variation in the interest spread may make banks more competitive and hence increases earnings and profitability.

The CAR, GDPG, INF, NPL* and LIQ* are more risky with a standard deviation of 9.2, 4.82, 4.01, 2.92 and 2.12 respectively as compared to BMS*, ER and IRS*, and with a standard deviation of 0.03, 0.09, 0.71

respectively. Therefore, all explanatory variables found to be more risky should be given adequate attention in an attempt to appropriately manage risk and hence increase performance. The maximum return of asset is 12.6% and the minimum return on asset is 1.16%. Apart from GDPG which is negatively skewed, (Skewed to the left), all the other variables are positively skewed (skewed to the right). Except for INF which is lower than it normal value of it (platykurtic), all other series are higher than the normal values of it suggesting that the kurtosis curve is leptokurtic.

Generally, the normal value of skewness is 'Zero' and for Kurtosis is 'three' when the observed series is perfectly normally distributed. Given that none of the values of the series satisfies these conditions of normality, the series is therefore not normally distributed. The result is consistent with the Jarque-Bera (JB) test statistics in which all its values are not zero or close to zero. The JB test is used to determine whether the given series is normally distributed or not, the null hypothesis is that the series is normally distributed against the alternative hypothesis that the series is not normally distributed. The result of the JB test rejects the null hypothesis that the series is normally distributed. Therefore, the series is not normally distributed.

Table 2: OLS Regression

Dependent Variable: ROA

Method: Panel Least Squares

Sample: 1998 2013

Periods included: 16

Cross-sections included: 6

Total panel (unbalanced) observations : 93

Variable	Coefficient	Std. Error	t-Statistic	Prob
C	0.037232	0.100906	0.368977	0.7131
NPL*	-0.129150	0.015664	-8.245145	0.0000*
IRS*	-0.013422	0.006067	-2.212296	0.0298**
CAR	0.012418	0.003293	3.771029	0.0003*
LIQ*	0.075767	0.039078	1.938847	0.0562***
BMS*	0.038690	0.021254	1.820363	0.0725***
ER	0.012298	0.003312	3.713164	0.0004*
INF	-0.056685	0.047255	-1.199556	0.2340
GDPG	0.039841	0.021089	1.889184	0.0625***

* means significance at 1%, ** means significance at 5% and *** means significance at 10%

Adjusted R-Squared= 76.65%, DW=1.92

The regression result in table 2 above indicates that NPL*, IRS* and INF negatively affects profitability and significance at the 1% and 5%, however, INF is found to be insignificant. This implies interest rate margin impacts negatively on banks performance. This signals that banks in Yemen are relatively uncompetitive. With an uncompetitive banking sector, the cost of capital is very high and therefore reduces profitability. This is because high interest rate margin may lead to issue of moral hazard, as customers with bad intention to default will have appetite to request for loans with high interest rate and eventually ends up with delinquency. This therefore increases the volume of non-performing loans and reduces profitability.

CAR, ER, are found to positively affect profitability and significance at the 1% level, while LIQ*, BMS* and GDPG positively affect profitability and significance at the 10% level. However the Efficiency Ratio (ER) and the Capital Adequacy Ratio (CAR) have minimal impact on profitability when compared to LIQ*, BMS* and GDPG. This implies that banks in Yemen tend to maintain high capital ratios relative to an optimal level, and hence affecting the opportunity cost of some investment options that could generate high returns and thus erode their performance and efficiency. Other things being equal, after adjustment for the degrees of freedom, the result suggest that about 76.65% of the variation in ROA is explained by variation in the independent variables. The result of the Durbin Watson Statistic, (1.92), very close to 2, which shows the presence of no auto-correlation.

Table 3: The Pair-wise Correlation Matrices Result

Variable	ROA	NPL*	IRS*	CAR	LIQ*	BMS*	ER	INF	GDPG
ROA	1								
NPL*	-0.54	1							
IRS*	0.14	-0.05	1						
CAR	0.51	0.23	-0.06	1					
LIQ*	0.52	-0.42	-0.02	0.61	1				
BMS*	0.46	0.05	0.01	0.57	0.55	1			
ER	0.03	0.16	0.05	0.04	0.02	0.31	1		
INF	0.06	0.02	-0.53	0.09	0.07	0.06	-0.07	1	
GDPG	0.26	0.03	0.19	0.19	0.21	0.3	0.02	0.44	1

The correlation result in table 3, above indicates that the NPL* is negatively correlated with ROA, This implies that as the volume of non-performing loans is increasing, the return on asset which reflects bank performance is falling. However, all the other variables (IRS*, CAR, LIQ, BMS* ER, INF and GDPG are positively correlated with return on asset, this implies that the liquidity, market and operational risk are fairly manage by banks in Yemen. Except for CAR and LIQ* that exhibits fairly strong positive correlation with ROA, however, the correlation among IRS*, ER, INF and GDP on profitability are weak, though positive, with correlation values of 0.14, 0.03, 0.06 and 0.26. In general, Banks in Yemen have demonstrated mixed understanding of risk management practices regarding the liquidity, market and operational risk, but apparently demonstrated weak credit risk management practices as evidenced by the high volume of non-performing loans, which may have the tendency to negatively affect their liquidity position and general operational, hence lower profitability. Therefore, the hypothesis that prudent banking risk management positively correlates with profitability is supported. Given that none of the correlation values exceed or equal to 0.7 (70%) suggest that multi-collinearity is not detected.

Table 4: Result of the Granger Causality Test

Hypothesis	No. of lags	F-Stat	Prob.	Conclusion
NPL* does not Granger Cause ROA	2	2.41392	0.0963***	Uni-directional Relationship
ROA does not Granger Cause NPL*	2	1.22820	0.2986	
IRS* does not Granger Cause ROA	2	5.89043	0.0042*	Uni directional Relationship
ROA does not Granger Cause IRS*	2	0.21032	0.8108	
CAR does not Granger Cause ROA	2	1.88842	0.1583	Uni-directional Relationship
ROA does not Granger Cause CAR	2	2.98977	0.0562***	
LIQ* does not Granger Cause ROA	2	0.00969	0.9904	Uni-directional Relationship
ROA does not Granger Cause LIQ*	2	3.59556	0.0320**	
BMS* does not Granger Cause ROA	2	10.0586	0.0001*	Bi-directional Relationship
ROA does not Granger Cause BMS*	2	3.35014	0.0403**	
ER does not Granger Cause ROA	2	0.17294	0.8415	Uni-directional Relationship
ROA does not Granger Cause ER	2	3.67222	0.0300**	
INF does not Granger Cause ROA	2	2.78936	0.0678***	Uni- directional Relationship
ROA does not Granger Cause INF	2	0.00896	0.9911	
GDPG does not Granger Cause ROA	2	2.54986	0.0848***	Bi-directional Relationship
ROA does not Granger Cause GDPG	2	3.11720	0.0500**	

Note: (*), (**) and (***) indicates that the null hypothesis is rejected at 1%, 5% and 10% level of significance respectively.
The appropriate lag length is selected based on the Schwarz Information Criteria (SIC)

The result of the Granger causality test in table 4, above indicates a bi-directional relationship between BMS* and GDPG with ROA at the level of their p-values. There exist a unidirectional relationship among NPL*, IRS*, and INF at the level of their p-values, the causation runs from NPL*, IRS* and INF to ROA. Uni-directional relationship also exists among CAR, LIQ* and ER, the causation run from ROA to these variables at the level of their p-values. In general, the Granger causality test result demonstrates a fairly strong evidence of a casual relationship between banks performance and implication of risk management. Hence, supporting the hypothesis that causality exists between banks performance and risk management in Yemen.

Conclusions

The relationship between banks performance and risk management practices is crucial in the understanding of the overall development of a country's banking sector, this research does not undermine poor banking sector performance and the consequences it can have on the financial sector and hence economic growth. Findings of the current literature are mixed and inconclusive and coupled with slow growth performance in the banking sector of Yemen since 1970 to mid 2000, despite the intervention of International Development Organizations in supporting financial and banking sector in the country, the question emerge, what are the determinants of banking sector performance and implication on risk management in Yemen? To the best of our knowledge, in the context of Yemen, there are some studies that have attempted to find out the relationship between financial sector development and economic growth in general, but studies on how banking sector performance impact on risk management are rear. These contradictory conclusions emerging from the empirical literature and coupled with the weak banking sector performance in the Yemen economy motivates this present study. Using banking data from 1998-2013, from Bank scope, we investigate the key determinants of banking sector performance and implication on risk management in Yemen.

The regression result reveals that capital

ratios are high, suggesting that banks in Yemen tend to maintain high capital ratios relative to an optimal level and thus erode banks performance. To reduce risk contagion, the central bank should do further research to determine the optimum levels of banks capital ratios. Since banks in Yemen are holding far more capital ratios than the prescribed by the bank for International settlement (BIS) standard of 8%.

Specifically the bad loans syndrome were observed in the study to negatively affect profitability, problem loans are very costly to recover and the whole efforts amount to throwing good money after bad. When some banks management and regulatory controls have led to deterioration of assets quality, high loan recovery cost associated to high risk exposure. Bad loan syndrome, poor risk management mechanisms, uncompetitive and non-optimal interest rates spread affects the liquidity and general operations of banks in Yemen. This is evidenced by the negative relationship between non-performing loans and profitability.

The correlation result supports the hypothesis that prudent banking risk management positively correlates with profitability. This is because effectively and efficiently management of banking risks may result to minimal default and delinquency and hence increases banking performance. The result of the Granger

Causality test also support the hypothesis that Causality exists between banking performance and risk management in Yemen.

Our findings have revealed important implications for policy maker, academicians and development partners that are assisting with the growth process of the banking and financial sector in Yemen, this is because the role of the banking sector is to mobilize savings, allocate resources and diversify risks. Given that the banking system represents an important share of the financial systems in Yemen, a more efficient banking system could positively impact financial development and economic growth especially if banks can effectively play their financial intermediary role (i.e. transform collected deposits in to loans for investments). They can do this if there is a much sound credit environment, risk management, judicial and legal support among other considerations. Hence the Government should strive to attain sound macroeconomic, political, social, policy

consistent and prudential regulatory requirements to make banks more robust and responsive to the needs of the Yemen populace.

Despite data limitation, our finding are still relevant and provides solid foundation of achieving broad based stability of the banking and financial sector and hence economic growth, since economic growth is conventionally expected to reduce poverty. Therefore, stability of the banking sector increases investment opportunities in the financial sector and hence reduces poverty. On this basis, we look forward to future study on banking issues with a view to further provoke policy discourse, such study could be the nexus between Government Regulation and Banking sector performance in Yemen.

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